YUKON UTILITIES BOARD

YEC BATTERY ENERGY STORAGE SYSTEM (BESS) PROJECT

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P R O C E E D I N G S

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Volume 2

May 5, 2021

Held via videoconferencing

Whitehorse, Yukon

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(PROCEEDINGS COMMENCED AT 9:41 A.M.)

THE CHAIR: Good morning, everyone. I think we're going to pick up, that is carrying on with Ms. Sabo's questions. But before we do that, I just

want to check if there's anything of administrative matter arising, technical issues or whatever to deal with before we proceed?

MR. LANDRY: Mr. Chair, if I may, we did file today electronically, a little different than we normally would do. We would normally bring it in and hand them to you, but that will be another day sometime. We filed electronically answers to the four undertakings as we understand the undertakings on the record. It was sent to all parties, but -- and we know that some, you know, may have looked at it, some may not. 09:40

If I could take a moment just to ask the panel to go over quickly those undertakings just to ensure that when we have them on the record and in case any questions arise, it's probably a good time to do it.

So I leave it to you, sir, but if I could have a moment to do that, that would be helpful.

THE CHAIR: Yes, that sound like a reasonable approach. So, yeah, proceed, Mr. Landry. 09:40

MR. LANDRY: Panel -- I believe it will be Ms. Milojevic to go through the four undertakings as we understand them, and if you could just take them through slowly one by one, that would be great.

**UNDERTAKING RESPONSES:**

**M. MILOJEVIC, A. HALL, E. MOLLARD, J. ZULIANI (For Yukon Energy Corporation), previously affirmed**

**A. MS. MILOJEVIC: Sure, thank you.**

**So the first undertaking was referring to UCG-YEC-1-16, part (c) and/or YUB-YEC-1-46, to advise what time period the 134 comments were received. This was in reference to the public engagement done for the project.** 09:41

**So our response just outlines the sources of the public comments that were received, as described in the report filed in the attachment to YUB-YEC-1-46(a). And essentially the comments were received between September 3rd, 2020, and October 13th, 2020.**

**For Undertaking No. 2, the undertaking was to provide a copy of the TransGrid study. So this study was referenced in some of the IRs being discussed in the cross yesterday. It was available publicly as part of YEC's 2016 resource plan, and was attached in** 09:42 **Undertaking 2 and is now on the record in this proceeding.**

**Undertaking No. 3 was referring to consolidated IR responses pdf page 197, to advise whether the projected GHG emission value of 606,736 tons was**

assuming only a subset of generation sources or was it limited in any way to certain facilities at the Whitehorse facility or did it look at all of the sources available on the grid?

So I know there's a few paragraphs here in the response, but to boil it down to the question, the Golder report, GHG projections looked at all generation sources available on the Yukon Interconnected System, so it was not limited in any way to facilities at the Whitehorse facility. 09:42

I also note from that response that the Golder report assumed thermal savings, based on analysis done early 2019, of only 1.6 gigawatt hours of annual thermal reduction. The updated assumptions in our Part 3 application assume 6.3 gigawatt-hours per year of thermal reduction. Accordingly, we would expect that the GHG savings realized by the project will exceed what was shown in the Golder report, just to give a general indication of direction.

Undertaking No. 4. Referring to the previous undertaking, to advise whether GHG emissions recorded in Table 9 would materially vary or not if the scope of the sources of power in the Golder report were expanded. 09:43

The response is no, since the sources of power

**considered in the Golder report were all sources of power available on the interconnected system.**

**That's all, Mr. Chair.**

MR. LANDRY: So, Mr. Chair, that is the only housekeeping matter we have, and so I put it back to you.

THE CHAIR: Thank you, Mr. Landry.

Ms. Sabo, are you ready to carry on? Oh, wait a sec.

Okay. So -- and those are in written form; right? 09:44

Yeah. So Exhibit B-6, 7, 8, and 9, will be those exhibit numbers we attached to those undertaking responses.

**EXHIBIT B-6 - YEC UNDERTAKING RESPONSE**

**EXHIBIT B-7 - YEC UNDERTAKING RESPONSE**

**EXHIBIT B-8 - YEC UNDERTAKING RESPONSE**

**EXHIBIT B-9 - YEC UNDERTAKING RESPONSE**

MR. LANDRY: Thank you, sir.

Thanks, Ms. Lemke.

MS. SABO: Thank you, Mr. Chairman and 09:44 Mr. Landry. Good morning to everyone on the virtual hearing today and to the Yukon Energy panel for the busy day of responses they're going to give us.

Mr. Landry and I were talking yesterday, and I was remiss in one thing. The Yukon Utilities Board does

have two interns this year who are listening in on the record. There is Jada Perkins, who is a first-year law student at the University of Calgary, and Dale Johnston, who is a second-year University of Calgary student. So we're glad to have them listening in to the hearing and to learn from all of your expertise.

And I'll just proceed with questions, Mr. Chair. That's all I had as preliminaries.

**MS. SABO QUESTIONS THE PANEL:** 09:45

Q. In the rest of my questions today I will be referring to the application, which is Exhibit B-1; the consolidated IRs, but the Yukon board IRs for your reference are at B-3; the opening statement, which is Exhibit B-5; and the transcript.

And my current estimated time of cross, due to some busy work last night from our team, is about three hours today. So everyone can govern themselves accordingly. You're in my care.

I would like to follow up, Mr. Hall, to start off 09:46 with a transcript reference about capacity shortfall and an answer you gave. So if you could please turn up the transcript, page 174 and line 14. And just let me know when you're there.

**A. MR. HALL: Andrew Hall. Yeah, I've got the**

**materials here, so please go ahead.**

Q. Thank you, sir. So starting in line 14 on that page, it states in part: (as read)

> "...in Figure 4.1, where the red line is the non-industrial peak and you can see that the sum total of the coloured sections are below the red line until such time that Moon Lake, the yellow line, is added."

So that response relates to Figure 4.1 and Table 4.1 in the application. And if anyone wants to pull that up, that's at pdf page 32 or hard copy page 28. 09:47

So do you remember those tables, sir, that address capacity and forecast non-industrial peak?

A. **MR. HALL: Yes, I've got them in front of me here.**

Q. Great. So I'm looking specifically at Table 4.1, and the committed and planned supply options, and the BESS line, which is projected to add, starting in 2022 and 2023, 7,000 megawatts over the life of this table. 09:48

The question we have in follow-up to what you said yesterday is if we were to move the BESS project from the forecast in this table and the figure, will there still be a capacity surplus once Moon Lake -- the Moon Lake project connects?

**A. MR. HALL: Yes. So essentially what you're asking is if in, for example, Figure 4.1, if we were to remove the purple segment, everything would shift down so that yellow segment would shift down. And so if I look, there would be a slight surplus of capacity in 2028/29, but then it would flip -- you would still have a deficit the following year, 2029/30 and 30/31. You would -- you know, so you'd be forced back into the rental business in those outer years.**

Q. So, given that response, would you agree that your response means that capacity shortfall concerns in the forecast capacity are not necessarily mitigated by removing the BESS Project, and there's also a reliance on the Moon Lake project connection? 09:49

**A. MR. HALL: Andrew Hall. Yeah, I think the point I was making yesterday is that each project contributes from the time that it's built going forward to addressing this shortfall. So once the BESS is in service, it's contributing 7 megawatts of dependable capacity, and it does that every year through its useful life.** 09:50

**And, you know, what we've very clearly communicated is, in doing so, it avoids the requirement to rent four diesel generators through the period until such time as Moon Lake is constructed.**

Q. Thank you for that clarification, sir.

I have some questions about system planning, renewables, and more traditional energy projects. And I'm going to start by taking you to the IRs, pdf page 270. And that's going to be -- so pdf page 270, the response to YEC-1-43(a) through (c). And it's on pages 1 of 2 of the hard copy.

In that response, (a) through (c), YEC stated: (as read)

"In October 2019, it was determined that considering the results of the technical, environmental, and socio-economic research, as well as feedback from the public, YEC would focus potential options to address or replace capacity at existing generation facilities on an incremental basis as diesel engines are retired. The results of the public engagement in particular indicated there is limited social licence for a greenfield diesel project in the Yukon at this time." 09:51 09:52

So can you talk about the general feedback of the public and the limited social licence for a greenfield diesel project at this time? I'd just like a little more

detail there, sir.

A. **MR. HALL: Sure. So going back to that period, we did initiate some planning work on the 20-megawatt diesel plant. It included, you know, public engagement and public outreach. We held a number of public meetings, if I remember, and we had a number of sites identified, so we were talking about very real potential project locations. And so we reached out to both the public and the relevant First Nations.** 09:53

**And I think, as outlined in the IR response, the feedback we received was pretty negative in the sense that people, you know, in general did not support us spending a substantial amount of money on a new 20-megawatt permanent diesel plant.**

**You know, I think that general sentiment has been echoed in a number of subsequent surveys that we've done, where the public in general is very strongly in support of investment in renewable supply options. And, really, that then gets reflected in policy that** 09:53 **has been rolled out, subsequently both at the federal level, as I referred to yesterday, and also the territorial through Yukon government's Our Clean Future.**

**So, really, you know, the feedback we got was**

there was likely to be a lot of resistance and opposition to construction of a 20-megawatt greenfield diesel plant.

I would also point out that, you know, the conversations with the First Nations probably, you know, led to similar conclusions. You know, they were not in favour of diesel plants necessarily. Their citizens had a number of similar concerns.

So, you know, I think the -- we looked at that situation. And then subsequently what was unfolding from a policy perspective and our board really through the 10-year renewable plan articulated a very different direction in terms of pursuing renewable options; namely Atlin and Moon Lake, and the battery for that matter, as capacity solutions going forward. 09:54

Q. And as part of that public engagement process, what extent does costs, you know, of green versus traditional project costs go into that discussion? Or is the public engagement primarily about the need?

A. MR. HALL: Subject to check, I do believe that we presented some cost information. I mean, obviously, as an economically -- you know, we were aware of the regulatory construct that we have in the Yukon, obviously, which considers costs very carefully. And so if I remember correctly, we would have presented 09:55

**cost information to the public.**

**And, so, you know, the intent there is to provide a balanced view. So it's not only about environmental attributes, for example, but we are transparent around cost implications.**

**So, yes, I mean, you know, cost is important to us, absolutely.**

Q. And just to follow up on that, Mr. Hall, I'm trying to get a sense on what is the process that YEC undertakes to evaluate the costs and benefits given that feedback on renewable projects, as being favoured by the public, versus the more traditional projects such as thermal, which might be more economical? 09:56

**A. MR. HALL: Yeah. So if you look, for example, at the analysis presented in the 10-year renewable plan and you look at the resource options and the information presented on each. And I'll just pull up the reference table. So it's Table 3 on page 48 of the 10-year renewable plan.**

**So what you see there is an assessment of a range of different supply options. And, you know, the left hand -- and so what's presented is the technical attributes. So their capacity, for example, their annual energy production. But the whole right-hand side of the table is very much around costs, not only** 09:56

in terms of upfront capital, operating and maintenance costs. And then two key sort of metrics that we then distill down, which is your levelized cost of energy and levelized cost of capacity.

So, you know, the intent is very much to ground the analysis in economics and, you know, in terms of specifically targeting the renewable options. And I think in particular about Atlin and Moon Lake and the battery, is that there was a recognition that significant federal funding was required to bring the 09:57
costs of those renewable options in line with thermal alternatives. And so that's -- we were very transparent and clear that we would only move forward with these projects if federal funding was indeed secured.

And so here we have an example in the battery project where we've secured the federal funding and we're bringing the project forward with, you know, more than 50 percent of the costs covered by the feds.

In a similar strategy with Atlin, for example. 09:58
So, you know, we have a major initiative underway to secure the required federal funding to bring that project from an economic perspective in line with thermal alternatives.

So that is the overall approach that we took in

**the 10-year plan and in subsequent execution of the plan.**

Q. At a very high level, Mr. Hall, what are the additional costs of going green versus using a traditional facility to provide capacity?

**A. MR. HALL: Well, it's a very good question. In the case of the battery, which I -- you know, is the subject of this proceeding, we've provided an analysis that shows there's actually a ratepayer benefit to going with the battery versus the diesel alternative.** 09:59

**So there's no cost -- in this case there's no additional cost, it's a benefit.**

Q. I was just thinking more from a structural perspective, you know, are there any different drivers of costs than you would normally see from a traditional facility perspective? And if the answer is "there aren't any" or "I don't know," that's fine.

**A. MR. HALL: Yeah, I think -- we don't really look at it that way. As I said, you know, our strategy financially is to -- if there is a premium to going** 10:00 **green, to use those words, that we would pursue federal funding to essentially eliminate those additional ratepayer costs.**

**So the approach very definitely is to not burden ratepayers with additional costs in terms of securing**

**that renewable feature.**

Q. I'm going to take you back to the transcript again, page 97, and starting at line 13. And I'm going to read this in, Mr. Hall, and it says: (as read)

"Our board of directors also made a very deliberate decision not to pursue a permanent solution, i.e. a permanent large new diesel plant and instead, you know, instructed us to focus on renewable projects such as Atlin and Moon Lake."

10:00

And to the extent you can comment on it, sir, what were the reasons the board relayed to you on social policy reasons or other reasons for their decision?

A. **MR. HALL: Okay. I'd say there was a couple of reasons. The first was the -- you know, in making that decision the board was taking into account the public and First Nation feedback that we had received. Right?**

**So they were taking a look at that -- that information and considering what the implications of that would be if and when we went to the assessment and permitting phase of that permanent diesel project. So that was the first factor.**

10:01

**And I would imagine their conclusion was, you**

know, that there was likely to be significant public opposition during the regulatory phase, which would increase the risk of securing the required approvals for the project from the permitting agencies and YESA [verbatim]. So that would be the first one.

The second one was they, at that time, were beginning to formulate the strategy around the focus on renewable options. In particular, as I said in the transcript, you know, shows the focus on Atlin and Moon Lake. And so the conclusion was, well, if you're -- if you've got a plan that's going to deliver a large step increase in capacity from, say, Moon Lake, that really erodes the justification of building a 20-megawatt diesel plant. There's just no point. Because if Moon Lake is coming along in 10 years, it would essentially make the diesel plant, in some respect, obsolete. 10:02

So with a long-term tech plan in place, the permanent diesel plant didn't really make sense in the board of context of the overall plan. 10:03

Q. Thank you, Mr. Hall. And given that, I know, going back to our Figure 4.1 and Table 4.1, I understand this is a consolidated approach with all of those projects in the plan that you're trying to build towards.

So, I guess, just at a very practical level, what

if one of those projects doesn't come to fruition? I know we talked a little bit about that at the beginning today, but what would be the default, or would you just kind of have to adapt and come up with a new project to meet capacity?

**A. MR. HALL: Yeah. I think it's important to realize that these plans are -- do evolve over time, no doubt. And, yes. I mean, if circumstances were to change and we were simply not able to secure the required amount of federal funding for Moon Lake, for example, then we may well have no real other option but to reconsider a 20-megawatt diesel plant. So it's a possibility in the future under certain scenarios.**

**But right now Plan A, and the plan we're working on, is to pursue that federal funding and be successful with that endeavour, and if we're able to then start the planning work on Moon.**

**But to summarize, yes. I mean, we can always re-evaluate plans and bring other options back onto the table if circumstances change.** 10:04 10:05

Q. Thank you. I'd like to talk a little bit more about the 5.2 million after -- for this project after federal funding. And given that there's some social policy items, and you commented on the clean energy plan of the Yukon government, I'm just wondering if YEC

explored additional subsidization from the Yukon government or local sources to offset the costs that would be borne by ratepayers of that 15.2 million?

**A. MR. HALL: At this time, no, we haven't pursued additional funding, but I would point out, again, that the business case for ratepayers is a positive. Table 4.3, to bring everyone back to that. There is a positive business case for the battery at the current level of funding.**

**So, in a sense, you know, additional funding in some respects isn't required to protect ratepayers any further. There's a benefit there already.** 10:06

Q. And if the project goes over the 30 percent contingency, would that be a tipping point for YEC with the BESS Project? Would that be kind of a lever where you might explore additional funding?

**A. MS. MILOJEVIC: So, Mr. Chair, in response to JM-YEC-1-33 part (b), YEC did present that the BESS Project would break even in terms of no longer providing ratepayer savings, but also not introducing ratepayer costs if the capital costs increased by 42.5 percent.** 10:07

**So as shown in part (d) of the same IR, so page 4 of 5 of that IR, we did show that same Table 4.3 that's in the application, but with the project capital costs**

increased by 30 percent, which shows that over the 20 years of the project, on a net present value basis, the project still saves over $2.4 million for ratepayers.

So even if the capital cost is on the plus 30 percent side of the estimate, it still provides savings/benefits for ratepayers.

Q. So Ms. --

A. MR. HALL: So, Ms. Sabo, just to make an associated point. You know, yesterday I talked a little bit about the way these projects advance through the planning process, and we talked about this -- what's called the stage-gate approach. So what's going to happen here over the next two, three, months is we're going to get results back from the RFP process for the battery, which will confirm a substantial part of the capital cost. And then we would take that information and package the project up for our board of directors to make a final investment decision. And so that -- that's kind of in the, you know, late July or August time frame based on the timeline as it looks today. 10:08 10:08

So our board will have the opportunity at that time to make a final decision. I mean, if we get bids back that are pushing the project to be uneconomic, you

**know, we would make a rational decision at that point, right, not to pursue it. We're certainly not expecting that to be the outcome, but, you know, we do have that decision point ahead of us.**

**Now, I just wanted to make that clear because -- and it's very important we have these very disciplined stage gates prior to undertaking and committing the company to the costs.**

Q. Thank you. That's helpful, Mr. Hall. And I'm assuming that, you know, if that decision is made in July, where there's a significant cost change, then maybe that's where you do -- like you say, you either rebalance the priority for funding of this project, or potentially would you go out and look for other funding to subsidize? 10:09

**A. MR. HALL: Yes, absolutely, yeah. That would be a very valid approach at that point, is to go out and see if we can secure funding to pull the economics back into favourable territory.**

Q. Okay. Government or otherwise. I guess I should be clear on that, because there could be loans or other private sources of funding. 10:10

**A. MR. HALL: Yeah. I mean, it's important to note that government grant funding is about the only way to buy down those costs for the purposes of**

**ratepayers.**

Q. Yeah. I shouldn't go too far off track, but I had just learned that there's social policy lending now, which, apparently, some banking institutions are doing that. I just found out about that recently. So, thank you, Mr. Hall. I know it's usually government subsidized in some way. So thank you.

I'd like to take you back to the IR response and take you to line 10 on page 2 of 2, if you still have that up. 10:10

**A. MR. MOLLARD: Sorry, what was the reference, Ms. Sabo?**

MR. LANDRY: Which IR is it, Ms. Sabo?

Q. MS. SABO: My apologies, I just had my mic off. It's IR 43 at pdf page 270, line 10 on page 2 of 2 of the hard copy.

**A. MR. HALL: Okay.**

Q. And in that response, YEC states that it would focus potential options to add or replace capacity at existing generation facilities on an incremental basis as diesel engines are retired. 10:11

How does YEC see the additions or replacements of capacity through renewal projects, specifically coinciding with diesel retirements? I know Mr. Mollard said yesterday, you know, there was an increasing

ramping up of rental diesel units. So I'm just wondering how the coordination of the additional renewable capacity is going to be dealt with in terms of maybe ramping down some of the diesel retirements.

**A. MR. HALL: I think there's only a certain amount that we can do to -- to work with timing. And what I'll point out is if you look at the timing of the diesel replacements, we've already retired a couple of Mirrlees engines in our Whitehorse facility. So from that perspective we already, you know, have a deficit** 10:12 **in terms of trying to maintain our existing fleet at a certain amount of capacity.**

**And then looking forward, the next diesel unit that we'll retire is up in Faro. And, you know, we have a little bit of flexibility to maybe delay that by a year or two, but ultimately it's not a very prudent thing to do, to continue to operate a diesel engine when it's really reached end of life. You're unable to support it from a spare parts perspective, et cetera.**

**So, you know -- so we have a fairly set schedule** 10:13 **in terms of when those diesel engines retire.**

**And then in terms of the planning of the replacement projects, as we -- as we indicated yesterday, I mean, those can be driven by planning and permitting timelines. So, you know, it takes time to**

**get through YESAA, it takes time to do the design and the procurement activities.**

**So you do your best to try and line these things up in time, but it's not a precise exercise, if that's what you're asking about.**

**And so, you know, we attempt to not have big discontinuities of how much capacity we have on the system, but the reality is that it does bounce around a little bit. And you can see, for example -- how you can observe that is on Table 4.1 of the application, page 28. If you look at the bottom of the -- the bottom row, which is your capacity shortfall, you know, that number bounces around a little bit from year to year as projects are coming online and units are being retired.** 10:14

Q. Thank you, Mr. Hall. I'm going to switch gears a little bit and I want to talk just generally about the Hatch report and that there was three siting options for the project, and that was reflected in the Hatch report. 10:15

I wanted to know from YEC what were the parameters or evaluation criteria that YEC or Hatch used to determine in locating potential sites? Like, how did we arrive at these three options?

**A. MR. HALL: So, in general, we talked a lot**

yesterday about proximity to our substations, our high-voltage substations. So that was a primary driver, is that we looked for sites that were located close to places that the battery could intertie into the grid.

And the reason for that is you really don't want to be burdening this project with a new transmission line to connect the battery to that substation, because transmission is relatively expensive and it's difficult to permit, to be honest, particularly around built-up urban areas like Whitehorse. So we looked to proximity to substations, No. 1. And so that identified the Takhini substation and our Whitehorse facility here, which has two substations as being, you know, general locations of interest. 10:16

And then we looked for locations where settlement land was available, because we very deliberately wanted to create an opportunity for a land lease with the affected First Nations. So we looked for parcels -- locations where there was parcels of settlement land close to our substations. 10:16

So using those two criteria alone it narrows things down really quite a lot. And, you know, what we found is there was a parcel of KDFN settlement land right next to our Takhini sub, and likewise there were

**two parcels, one belonging to Ta'an Kwach'an Council and one to KDFN, close to Whitehorse here. So that was really the logic that was applied.**

**Then there was a subsequent analysis to do the down selection of the three, the three locations. But I think in terms of that first step of location identification, that's what we followed.**

Q. And just to be clear on that response, Mr. Hall, it's both of those criteria used together? I guess as a follow-up, did you look at sites, say, out of Whitehorse that didn't involve First Nations land? So I'm just trying to think did you use both of those requirements in conjunction or did you evaluate, okay, well maybe there was some outside of Whitehorse, but didn't involve First Nations or Indigenous land? 10:17

**A. MR. HALL: No, I mean, the sites had to meet both criteria. And I would say we were fortunate in that there were settlement lands, parcels extremely close to our substations. I mean, I'm not sure you could get them closer. So, you know, we were fortunate in that respect, but they did have to meet both criterion.** 10:18

Q. Did those criterion just get generated internally or was there government discussions or other stakeholders that were driving those criteria?

**A. MR. HALL: No, that was internally generated. And, you know, the first -- the first criterion, namely, you know, proximity to a substation, that's a pure economic driver, right? I mean, it just makes economic sense to be close to a substation. And technical sense in terms if you look at the hardware required to connect to the grid. It's much more convenient to do it through a substation.**

**And then in terms of the -- looking for First Nation settlement land, that was a very deliberate strategy of our board and of the company, to make economic opportunities available to First Nations through our new project.**

10:19

Q. Okay. Thank you. I'm going to move to a different area, Mr. Hall, and we had a fulsome discussion yesterday about the terms of reference. So if I could get you to pull those up again. And I'd like to take you specifically to Section 3(c) again, which deals with the risks of the project.

**A. MR. HALL: Okay.**

10:20

Q. Thank you. We'd like some more information on -- and discussion on these risks.

How should the Board assess the risk of the need and the costs of the project given that vendor selection is not finalized?

A. MR. HALL: Right. So if you think about the risk of the need, I would draw you back to Figure 4.1 in the application, which shows that we have a capacity deficit today. You know, we rent diesels today. So the opportunity to avoid renting diesels and deliver those savings to ratepayers exists today. And I think it's pretty unlikely that our peak demand is going to drop. You know, if anything, it's going to keep on growing.

So I would propose that the risk of need is virtually zero, because we rent today. We're not talking about a future need that may transpire. This is a need we have today. So I think that risk is low, if not zero. 10:21

In terms of the risk on the costs, a couple of comments. You know, we've shown that, you know, with a -- I would argue a very sizeable increase in capital costs, the project still delivers benefits to ratepayers. And we've been through that point at length in terms of looking at the scenarios that Ms. Milojevic just spoke to around, you know, what happens to those economics at a plus 30 percent cost escalation. And we've demonstrated, in my view, that the economics are robust and in a way accommodate a cost escalation that I can't really foresee happening. 10:22

The other point that we haven't spoken about a lot is this project is quite different from the other kinds of projects that we've undertaken. Namely, it's pretty -- relatively simple, I would say.

You know, when you build a hydro facility, you're doing extensive civil work; you're subject to large geotechnical risk; you don't know what's under the ground until you start digging, basically; and you're building in the field large dams, large structures.

This battery project is very different from that. 10:23
There's very minimal site work required. We're not excavating a whole lot. We're not blasting. It's basically clearing land and pouring some fairly limited foundation work.

And then you're installing containerized modules that get shipped up from the supplier. So the amount of site work required is much lower.

So I would say the features of this project in terms of the way it will be executed speak to much lower construction risk and therefore, I would say, 10:24
lower cost risk overall. And so that's the way we've -- and we were very deliberate in terms of, you know, pointing to a containerized solution. We didn't want -- we wanted to avoid having to build a building to house this battery, which again would have

**introduced risk, and really wanted to simplify the way this project will be executed. And so that's -- that's really the approach. And I think -- I would say the Board can take some comfort that the nature of the project speaks to lower cost risk overall.**

**A. MR. MOLLARD: And if I could just offer a comment, Ms. Sabo. We talked a little bit about this yesterday in terms of when we were going through the terms of reference. The terms of reference very specifically talks about potential impacts on rates.** 10:24
**And while we didn't specifically provide rate impact information, I would highlight the table that we provided at 4.3, which is really the foundational economic piece. That table is essentially prepared on a revenue requirement basis.**

**So while you can't see from that table exactly what impact to a customer, it does highlight what the impact to revenue requirement, which becomes rates, is. So in that way we are showing that impact or that risk through that table.** 10:25

Q. Okay. Thank you, Mr. Mollard. I might be going back there a little bit later. So thank you for planting that seed.

So, Mr. Hall, given that there's limited or no geotechnical work, I'm assuming there won't be a

geotechnical report on this project?

**A. MS. MILOJEVIC: There will be a geotechnical assessment done in order to finalize the civil engineering. So it will be a smaller endeavour than for a more geotechnical intensive project, as Mr. Hall was referring to, but there will be a geotechnical report.**

Q. And, Ms. Milojevic, when would that report expected to be completed?

**A. MS. MILOJEVIC: The geotechnical work is expected to be completed in Q2 2021. So we would expect the report shortly after the physical work is done.** 10:26

Q. Thank you. Mr. Hall, you've already talked a little bit about, you know, risks and maybe net zero risks or positive risks as a result of a project. I just want to follow up a little bit more about whether the size and configuration of the BESS, how the risk of that will factor in when we don't have the recommendation from a selected vendor yet.

**A. MS. MILOJEVIC: So --** 10:27

Q. Maybe I can help out a bit here. You had said yesterday that you expected the technical details of the 40-megawatt hours of the system might be subject to small changes. So that was kind of one example of what we were thinking of.

**A. MR. HALL: Right. So we've specified the battery in a particular way, and the key metrics there, as you point out, are the amount of energy storage, so the megawatt hours, and that's been set at 40, and then the inverter size, so set at 20 megawatts. That combination, in our view, offers the optimal solution to deliver the benefits that we're targeting.**

**Now, we obviously will look at the vendor quotes that come in for that solution. And, you know, obviously the first check will be can they meet the technical specs and is their price in range with our current budget.** 10:28

**If we find that we're not meeting either of those two, so, in other words, the vendors can't meet our technical spec or the pricing is out of line, then there is a process where we could look at making some adjustments to, you know, fit within budget, would be the simple way to say it.**

**But I don't want to get ahead of myself in the sense that we don't -- you know, at this time we have solid costing information from our advisors at Hatch, and we don't have any indication that we have a budget problem at this time.** 10:28

Q. And when you say --

**A. MR. HALL: Sorry, that will be subject,**

**obviously, to the final round of RFP, which is yet to come in the next couple of months.**

Q. Okay. When you say that there may be a process to address that, I'm assuming that's an internal process, management or management and the board?

**A. MR. HALL: Correct.**

Q. Other risks that we wanted to ask about is both the NAV Canada and Transport Canada approvals are outstanding. Can you maybe give me an update on where that's at and what you think the risk to the project of those approvals would be. 10:29

**A. MS. MILOJEVIC: Yes, Ms. Sabo. So both applications for the NAV Canada and Transport Canada land use assessments were submitted in March of this year. So we expect those to be concluded likely this month, based on the normal timing.**

**Both are fairly low risk. When you're talking about these assessments, they're mainly concerned with is there any potential obstruction with the flight path, given the proximity of the site to the Whitehorse airport.** 10:29

**But this project, again, is a lot different than, let's say for example, the LNG project, where you have a plume coming out of the stack that could potentially -- that would have to be analyzed around**

**potential interference with aviation. The battery project relatively is very short. It is not tall. It doesn't send anything up into the air visually.**

**So we expect, as sort of the worst case, it might be some lighting requirements or obstruction markers. So poster signs or lights or beacons to alert the location of the battery. That would be well within what we've estimated in cost. So we don't see a large risk.**

**Our position on that has been informed also with discussions with Yukon government and staff at the airport itself, confirming that there are battery projects near airports and that just generally the nature of the project presents a low risk with regards to those assessments.** 10:30

Q. Okay. And any estimation on timing for those approvals, either, you know, an average of how long they usually take or if you have more specific knowledge about your expected approval times?

**A. MS. MILOJEVIC: We did respond to that in an IR. Just give a moment, Ms. Sabo, and I will pull it up.** 10:31

Q. Thank you.

**A. MS. MILOJEVIC: Perhaps we could take an undertaking, Ms. Sabo, to follow up. I believe it's within the range of 90 days, but we did confirm it in**

**an IR, so we can come back with that.**

**A. MR. MOLLARD: YUB 33.**

**A. MS. MILOJEVIC: Oh, we do have it, sorry.**

**A. MR. MOLLARD: Apologies, YUB 33. I believe it's (c) response.**

> **"While the timelines can vary, the NAV Canada assessment typically takes 8 to 12 weeks, and the Transport Canada process typically takes 90 days."**

Q. Okay. And no update to that timing on an actual basis that you know of? 10:33

**A. MS. MILOJEVIC: So typically the process is you submit the application, they go through their process, and you hear at the end if there's any recommendations. So we don't expect a back-and-forth. We will just hear when the assessment is completed.**

Q. Thank you. Since the dates that the Hatch study was prepared and just given the general climate, economic climate, and COVID circumstances we're in right now, does YEC foresee that there will be any risk to materials costs or O&M that maybe weren't contemplated at the time the Hatch study was prepared? 10:33

**A. MR. HALL: Yeah. I mean, it's a very good question. There's certainly -- you know, people are starting to talk about inflation drivers related to**

**COVID and shortage of certain raw materials, lumber for example, but, you know, I would point that -- out a few things.**

**The one is, as I just sort of described, the amount of site work required in this project is relatively low. So our exposure to, you know, what you would normally consider being required, you know, and where inflation could be brought to bear, we assess as being pretty low.**

**The second point is, you know, most of the costs of this project are tied up in the battery supply. And, yes, there may be some inflation drivers on certain components of the battery, but also we know that batteries overall in general are getting cheaper, as more production is brought online. So you've got a, you know, a driver that's moving in the opposite direction.** 10:34

**So at this point we don't have any evidence either way that the capital costs are going to change. And obviously, again, the certainty around that will be -- will come through the RFP process in the next couple of months.** 10:35

Q. Okay. Thank you, Mr. Hall. We've talked a little bit about, and there's information on the record and some of this was mentioned yesterday, that certain

agreements are outstanding, like the finalization of the vendors and the debenture agreements. I'm just wondering if you could kind of itemize for me the other agreements that are outstanding at this time.

**A. MR. HALL: I'll start the list, and my colleagues can chime in if they have others.**

**Yeah, obviously our major procurement contracts are outstanding. We have an owner's engineer contract signed, but the other contracts, which would be the battery supply and then for the site construction, have yet to be procured and signed.** 10:36

**The -- we are targeting final project agreements with each First Nation, but they will be very consistent with the term sheet that has already been signed with the First Nations, and we're not expecting any changes in the material terms, particularly as they relate to the debenture.**

**So in terms of agreements, my colleagues, any other comments?**

**A. MR. MOLLARD: Yeah. So similar to the project agreements with the First Nations, we have a term sheet for the land lease with Kwanlin Dün First Nations Development Corporation that needs to be finalized.** 10:36

**A. MS. MILOJEVIC: And finally, Ms. Sabo, I would add the agreement with ATCO Electric Yukon regarding the**

**use of the right-of-way for the transmission line for the project.**

Q. Thank you. I'm going to circle back a little bit more and follow up with the N-1 criteria, Mr. Hall. And I know we keep on going to capacity, but it's such an important part of this. And I wanted to follow up with you on an answer you gave to Ms. Graham at page 159 of the transcript, and it's line 7. So 159, line 7.

And the question she asked you was related to whether a diesel generator provides a better ability to 10:37
mitigate loss of curtailed load during an N-1 event relative to the BESS Project.

So starting at line 7, you replied: (as read)

"...I would argue that a diesel is worse because a BESS -- as we discussed in the application, it has almost instantaneous ability to ramp to full output, whereas a new diesel plant can take several minutes to ramp up. And so a BESS has much greater ability to keep the grid 10:38
stable and operating versus a diesel engine."

And it occurred to us, suppose an event lasts for a long duration let's say from a day to a week. Will the diesel generator still be considered worse than the

BESS Project in mitigating loss of production?

A. **MR. HALL: Look, I'll point out that both are appropriate solutions. Like -- and we live by that today. We have diesel units in our fleet that we count towards our ability to meet the N-1 criterion. So I think -- it's not like a diesel doesn't work. I believe the question was more like, well, which is better. And I was pointing out one of the features of the BESS that would make it better, particularly right when the event happens.** 10:39

**So that was the point that was being made. Because appreciate, you know, if you have an N-1 event, namely the Aishihik plant got flooded, for example, what would happen today would be the diesel units wouldn't be able to ramp up sufficiently quickly, and so we would -- the grid would go black and then we would have to recover and restart.**

**If we had the BESS, we would have a chance of keeping the grid operational and avoiding that blackout and recovery. So that was the feature that I was** 10:39 **pointing to in the response yesterday.**

**But I just -- I want to make the point that diesel engines work as a solution to meet the N-1 criterion.**

Q. Right. If you had a longer duration event, from a day to a week say, would that be one scenario?

**A. MR. HALL: Yeah, I don't think -- I mean -- yes. I mean, you know, it's possible that an N-1 event could last for -- you know, I think our planning criterion is a couple of weeks. And that sort of speaks about, well, you have to do some repairs that would take a couple of weeks, right?**

**And so, you know, I think both would work equally well over the longer term, i.e. the two-week period.**

Q. Mr. Mollard, was there something you wanted to add to the earlier comment? 10:40

**A. MR. MOLLARD: Yeah. No, just to sort of tag onto what Mr. Hall said. They both in a longer outage would serve the same function. The battery would still be required to recharged in off peak hours, and that may be one of the scenarios we're charging with a different source than we would like to. We may not have sufficient hydro resources to recharge, but when we need the resource, the diesel and the battery would both be there for us to serve that need, as Mr. Hall said.** 10:41

Q. Right. From whatever source that you could draw from in the circumstances?

**A. MR. MOLLARD: Exactly.**

Q. I'd like to take you back to the IRs, and IR 17 to the Board, the response to (b) and (c). And that's on pdf

page 158. So IR 17(b) and (c).

THE CHAIR: Ms. Sabo, sorry to interrupt. It's probably a good point in the morning to take a break.

MS. SABO: Sure. That would work for me. I can stop after the next two questions, if that would work for you, Mr. Chairman.

THE CHAIR: If that's a good point in your flow, carry on.

MS. SABO: Thank you. 10:42

Q. Do you have that, panel?

**A. MR. MOLLARD: Yes, we're just reading the question and the answer.**

Q. Great. Thank you. So I'm looking specifically at part (c), where YEC stated: (as read)

> "YEC followed a competitive process for sourcing diesel rentals as follows."

And then it goes on to explain its public competitive tenders for each of 2018 and 2019, 2019 and 2020, and, finally, 2020 and 2021. 10:42

So what is driving the increase in number of diesel units forecast through modelling to meet the winter season? Is it the modelling itself, weather, demand, and/or other factors?

**A. MR. HALL: So the increase in the number of**

rentals is driven by largely an expectation that our peaks will continue to grow. And you see that expectation, again, bringing everyone back to Figure 4.1 in the application, where that red line, so the forecast non-industrial peak, is growing.

And we've got excellent evidence of that. I mean, I would point out that -- and this is in our GRA application, the data. But in 2018 our peak was 93 megawatts, and in 2020 it had grown by a full 10 megawatts, to 103. So we've got both historic growth and forecasts future growth. 10:43

And, you know, what are the drivers of that? Well, it's ongoing growth in the population of the Yukon, growth in housing starts, and a shift towards electric heating over fossil fuel heating, which we see in new subdivisions such as Whistle Bend, for example.

So I think the trend and the expectation of a continued trend of growth and peak demand is well founded and well supported in fact.

Q. And that's what's driven the projections in the red line for the non-industrial peak in Figure 4.1? 10:44

A. MR. HALL: Correct. In the longer term there is modelling involved as we look, you know, further out, and that draws upon expectations around electrification. So we know coming out of Yukon

**government's Our Clean Future strategy that there's a significant amount of funding support going towards some adoption of electric vehicles, for example, and electrifying space heating. So they have specific programs to subsidize the purchase of electric vehicles and electrification of home heating.**

Q. Thank you. And I've got one more question about diesel units. Is the option of buying diesel units to cover shortfall available as an alternative? I know you've done your comparative analysis on renting, but we were wondering if buying diesel units would be a good alternative, to cover capacity shortfall? 10:45

A. **MR. HALL: Yeah, I mean, it's a curious question in the sense that, for us, buying diesel units really is the 20-megawatt permanent diesel facility. I think as a utility, the idea that we would buy these rental units and somehow situate them in our parking lot on a permanent basis, that has a number of -- of consequences that, you know, it makes it an option that we really wouldn't consider.** 10:46

**As Mr. Mollard pointed out yesterday, these rental units are not quite configured for utility service perfectly. And so if I was looking at a purchase decision, I would look at buying quite a different thing.**

**So I view the rental decision versus the permanent purchase quite differently.**

**A. MR. MOLLARD: And I would add, Ms. Sabo, just as an anecdotal comment, you know, there's an old saying that you look like you rented it, and these units have generally had a pretty hard life. So if we were speccing something to place on the grid that we absolutely needed to have because they're there for the N-1, we wouldn't look at something that had the kind of use history that these rental units have.** 10:46

Q. Okay. And you both mentioned you'd look at something else. What would other options be?

**A. MR. HALL: Well, ultimately, where you end up is something along the lines of a 20-megawatt diesel plant. It might not be 20 megawatts. I think there's a case that we present -- you know, we present some economics in the application around a 12.5-megawatt diesel plant, but you're in the game of looking at a permanent diesel facility.**

Q. Right. So not smaller options? We're again back into those larger facility options? 10:47

**A. MR. HALL: Correct, yeah.**

Q. Thank you.

MS. SABO: Mr. Chairman, thank you for letting me go long. I'm not sure if you want to take

10 or 15 minutes.

THE CHAIR: Let's take 15. And since it's our only morning break, maybe we can go through till noon or shortly after.

MS. SABO: Fine with me, sir.

(ADJOURNMENT)

THE CHAIR: Okay. Ms. Sabo, are you ready to carry on?

MS. SABO: Yes, please, Mr. Chairman.

THE CHAIR: Then please proceed. 11:06

Q. MS. SABO: Panel, with respect to the BESS Project, I promised I would ask some more questions about costing.

Is it YEC's position that you're only relying on the Hatch report for the accuracy of the estimated BESS Project costs?

**A. MS. MILOJEVIC: No. I would say that we are relying on the typical class estimate. So when you're talking about engineering, as you pursue different levels of detail of engineering, you typically have a** 11:06 **class of estimate, which essentially gives you your range.**

**So the Hatch report gives us an estimate for the BESS system at a plus or minus 30 percent capital cost range, but then there are other costs in addition to**

**the Hatch report, such as owner's costs, that we've also included at that level of accuracy at this time, based on where we are in the design process.**

Q. All right. And you've done that based on your own costing information and your own judgment?

**A. MS. MILOJEVIC: Yes.**

Q. Are there any limitations, from the YEC perspective, on the comments and findings in the Hatch report regarding cost estimates?

**A. MS. MILOJEVIC: Sorry, Ms. Sabo, could you just clarify the question for me, please?** 11:07

Q. Yeah. So the Hatch report goes through the estimated cost for the project. Are there any limitations to that report and its findings or its recommendation on technical requirements, from a company perspective?

**A. MS. MILOJEVIC: No. We are confident in the cost estimates provided at the class level of plus/minus 30 percent. As I said, they do omit some of the owner's costs, which we did include in our application as part of the total project costs.** 11:08

THE COURT REPORTER: Sorry, Ms. Sabo, are you speaking?

MS. SABO: Oh, thank you, Madam Court Reporter.

Q. Given that completion for the project is expected for winter 2022/2023, are there any other factors not

included in the Hatch report that will drive the completion of that project either on that date or after that date?

A. **MR. HALL: The overall project execution timeline will be driven by a couple of different factors. So, first of all, we have the expected timeline on the permitting, which we don't believe, you know, there's any uncertainty around. We're in, as Ms. Milojevic outlined yesterday, yes, the submission is in and we expect the permitting to proceed fairly adroitly here.**

**The key drivers will be the delivery lead time for the battery hardware itself, and the transformer in particular. So that's the transformer that pumps up the voltage and -- to the required voltage to get the power to the Whitehorse facility here. So that lead time has not yet been confirmed. And, you know, we'll only have certainty around there once we have those RFPs in and place the order.**

11:09

Q. Thank you. I'm going to take you back to the plus or minus 30 percent accuracy or contingency. If you could turn up pdf page 20 of the application, hard copy page 16, and I want to go to Table 3.4, which was discussed yesterday as well.

11:10

MR. LANDRY: Sorry, what was the pdf

page number in the application again?
MS. SABO: Page 20, Mr. Landry. Hard copy 16.
MR. LANDRY: Thank you.
Q. MS. SABO: And Table 3.4, in the third row of that table is the battery system costs of 19,985. And I just wanted to know if you could give me a breakdown on how that estimate was derived, that total estimate of 19.9 million.
**A. MS. MILOJEVIC: That estimate was derived in the Hatch report, so I'll ask Ms. Zuliani to outline its estimate.** 11:11
Q. Thank you.
**A. MS. ZULIANI: Thank you, Ms. Sabo. So the estimate was derived based on benchmark pricing and inhouse data that we have from other projects for battery costs of a similar nature, as well as including allocations for other components of the battery system, as well as an allocation for added costs due to the Arctic climate.** 11:11
Q. And is that a proprietary database that you use or do you pull that from public sources?
**A. MS. ZULIANI: Both. We do pull from public benchmarks, but we also use inhouse data we gather on other projects as benchmarks to keep current.**

Q. Okay. And on a very high level, what type of costs are included in that 19.9 number? What cost categories go into that?

**A. MS. ZULIANI: So primarily this is driven by the cost from the battery vendor, as well as allocation for other components, such as communications, added costs for Arctic conditions, and transportation to the site and whatnot.**

Q. Okay, that's helpful. Is there any other context that you can give me on anything else that's included in there? 11:12

**A. MS. ZULIANI: I'll just say that the battery system goes with the power conversion system, which is the inverter and the other electrical components of the system, as Mr. Hall mentioned.**

Q. Ms. Zuliani, I'll come back to you in a minute. I'm going to pop back to the YEC panel. They might defer it back to you, but this might seem like a seemingly simple question, but in Table 3.4, it shows the estimated capital cost of the project facilities. And 11:13 YEC states that the 3. -- or, sorry, rather 31.7 million used 2020 costs plus or minus 30 percent. And then it says they included a 15 percent contingency.

So what I'm trying to understand with Table 3.4

is, is the plus or minus 30 percent baked into that table and then a 15 percent contingency applied? Or does this table only reflect a 15 percent contingency?

**A. MS. MILOJEVIC: The table includes a contingency of 15 percent, which is applied to the battery system and power conversion system. So essentially the largest portion of the project costs include that amount, the contingency of 15 percent on that.**

**Other elements in the Table 3.4 do not have their own separate contingency applied, which is why, Ms. Sabo, if you look at the contingency line in Table 3.4, the total percent contingency included in the $31.7 million estimate is actually 12 percent. So when you look at the total estimated cost, it's actually a 12 percent contingency included.**

**Then because of the accuracy of the cost estimate that we are at at this point in the design, we would say that the cost variance, so the accuracy, is plus or minus 30 percent. So the plus or minus 30 percent is applied to the 31.7 million, which is after the 12 percent contingency that's been included in that number.**

Q. Okay. Thank you. And, Ms. Milojevic, do I have it right that the expected net benefit to customers will be seen at or about Year 7 given that contingency? I

thought you had said that somewhere on the record. I just wanted to confirm.

**A. MS. MILOJEVIC: No, I don't believe so.**

Q. Okay.

**A. MS. MILOJEVIC: If you look at Table 4.3 on page 39 of the application, there is a net annual ratepayer saving in the first year of the project. So in the last column of the table, that's the sum of ratepayer savings. So if those numbers were negative, it would be an in-year cost, positive implies a savings.** 11:16

**So in the first year there is a savings. And that is that $31.7 million estimate, apologies.**

Q. No problem. So you're referring to the total annual savings, which is Column H?

**A. MS. MILOJEVIC: It's Column I.**

Q. Oh, sorry. Yeah. So the total annual savings are in Column H and then the net annual are in Column I?

**A. MS. MILOJEVIC: That's correct. So Column I accounts for the total annual savings in Column H, but it also accounts for the project costs from Column D.** 11:16

Q. Okay. Maybe I got your seven in there when it starts to kind of have that cumulative impact in there. Thank you very much for walking me through that.

Ms. Zuliani, I want to take you to the

Hatch report, in Tables 11-1 and 11-2 of that report. The pdf page is 165 and the hard copy of report -- in the small page number in the report is 99. And let me know when you're there, madam.

A. **MS. ZULIANI: Yes, I'm here.**

Q. Okay. Those tables provide cost estimates for two different sites: the TKC site in Table 11-1 and the KDFN site in 11-2.

And it provides costs -- capital cost estimates for CapEx in the last three columns of each of those tables. So I was wondering if you could just generally walk me through how those three columns -- I'm assuming in each of the table you used the same methodology or base data, but can you walk me through how those estimates and those columns of those tables are derived. So BESS CapEx other and total CapEx. 11:17

A. **MS. ZULIANI: So the BESS CapEx, as we just discussed, is derived based on our benchmark pricing of batteries of similar projects, with allocations for project-specific considerations like cold weather, transportation, and allocation for installation, and allocation for other electrical components and communication components within the BESS.** 11:18

**The other CapEx is based on engineering costs as well as site preparation costs, which were derived**

**based on estimates from our civil engineering team.**

**And then the total CapEx is the sum of the columns before that. So the inverter transformer interconnection CapEx, the BESS CapEx, and other CapEx.**

**I think we may have missed the inverter transformer and interconnection CapEx. And those are based on costs for -- again, benchmark costs and our database for inverters, transformers, other electrical components needed in the system, and the interconnection estimate to the Whitehorse Rapids facility.** 11:19

Q. Okay. And would that be a material change to the numbers in these tables? The --

**A. MS. ZULIANI: Sorry. We at Hatch did not miss a cost. When you just stated -- you stated the last three columns, there's actually four columns of cost in there.**

Q. Oh, I'm sorry, yes, you're right. There's the inverter, transformer, interconnection CapEx, which is the fourth column from the left. Thank you. 11:19

**A. MS. ZULIANI: Yes.**

Q. Okay. So in preparing these tables, do you prepare a benchmark summary or report to YEC that shows how -- how your benchmark works and what the comparators are?

**A. MS. ZULIANI: So this is the information we provided to Yukon Energy, or YEC. The benchmarks are based on either public information or, as I mentioned, based on our inhouse databases developed through our projects. So, no, we don't provide those to YEC.**

Q. Okay. Yeah, I was just trying to get a sense of how many comparators you use and kind of what criteria you use. So, I mean, if you're verbally able to speak to that, that would be helpful. Or if you don't have that information available, if you could take that away as an undertaking, about the number of comparators you use. 11:20

**A. MS. ZULIANI: So, I mean, for the major project costs, we use it either based on quotations, either we've solicited them from vendors on discussions with vendors. So we use up-to-date information as we can gather for the project from respective vendors.**

Q. Okay. So do you keep track of the number of comparators you use to compare them to this specific project or is it just a general review of what's going on in terms of other projects that are similar? 11:21

**A. MS. ZULIANI: Well, given the level of engineering we're at on this project, it's a general review. That is part of why we're doing the two-stage procurement, which I would pass back to my colleagues**

**at YEC.**

Q. Okay. Thank you. I'd like to talk about the levelized cost of capacity, and YEC had responded to the Board in an IR, and that's IR 27 on pdf page 224, hard copy page 1 of 1. And this will be to the YEC panel.

And you'll see in that IR, YEC states that the levelized cost of capacity is $235 per kilowatt hour, including transmission and interconnection.

And then I'm going to move you to the application, pdf page 26. And on that page YEC talks about the Whitehorse interconnection facility. 11:22

So I'm trying to get a sense on how these two responses are interrelated. More specifically, have the costs for this project been included in the total costs for BESS? For the Whitehorse interconnection facility, have those costs been included in the total cost for BESS?

**A. MR. HALL: So the Whitehorse interconnection project has a broader scope than just, you know, accommodating the BESS Project. What we face in the Whitehorse facility is a concern around the number of generation sources that are being connected to our S150 substation. And so those would include rentals, the LNG plant, and the expected diesel replacement units in the future.** 11:23

**So the Whitehorse interconnection project looks at sort of rejigging the way in which these various sources connect to the system and actually connecting a couple of the sources over to the Riverside substation across the river. And so its scope is broader and its need exists today. We need to do that Whitehorse interconnection study -- the project, sorry, whether the battery was proceeding or not.**

**But, I mean, having said that, the Whitehorse interconnection study will -- does anticipate the battery being connected, and then the battery -- sorry, in its design.** 11:24

Q. And given that response, how does that affect -- is that factored into the total costs of BESS, that interconnection, or not, Mr. Hall? I'm just kind of wondering what the interrelated impact of the costs are.

**A. MR. HALL: So if I point you to Table 3-4 of the application, on page 16 of the application, there is a specific line item, "Grid connection," which would connect the battery project to the fence-line of the Whitehorse facility, and then any other costs, you know, related to the interconnection project would then be part of that separate project.** 11:25

Q. In the case of the purchase of the 12.5-megawatt

Takhini diesel option, would a similar costing analysis be done as what's in Table 3.4?

**A. MR. HALL: Well, it certainly would have been done. It would have been based on a certain level of accuracy. I believe there's a report that -- we mentioned the Midgard estimates in Footnote 30 on page 17. So there was a study done by Midgard that would have fleshed out an estimate of the Takhini diesel facility.**

Q. Thank you. I want to move a little bit to talk about operating expenses. And you can go to hard copy page 17 of the application, pdf 21, and we were near there already, on Table 3.5, the estimated annual operating costs for project facilities in 2020 dollars. The Board would like further detail on how these estimates were derived. I see you have some notes there, but maybe you could just walk me through the table, whoever is best to speak to that. 11:26

**A. MS. MILOJEVIC: Yes, Ms. Sabo. So the annual site lease, the first row in the table was determined from the actual lease offer that we received for the site, and that expected cost.** 11:27

**The annual operating expense and the OpEX in Row 2 was taken directly from the Hatch report around the cost to operate a battery. And that includes**

**maintenance and -- preventative maintenance and spare parts were required for maintaining the unit.**

**The third item, property tax, was based on the current City of Whitehorse mill rates and the expected value of the project. So calculation based on what we believe the best estimate of the property tax would be with our knowledge to date.**

**The fourth row, insurance, was also based on an estimate from the Hatch report.**

**And then, finally, the transmission operating and maintenance would be the O&M costs to maintain the line that runs from the battery site to the Whitehorse Rapids facility. And so that's essentially vegetation management to keep the line clear. And that's a general estimate based on 1 percent of the capital costs, which is a typical number used in planning transmission O&M.** 11:28

Q. And I understand, you know, property taxes is quite high, and you've said that's the case given Whitehorse and where this project is located. 11:28

Is that a significant driver on location of the project? I know, Mr. Hall, we talked this morning about what the major criteria were, but how much did property tax impact the decision on site, if at all?

**A. MR. HALL: Well, it certainly was a factor**

**that we were concerned about during the site selection, and that explains why we -- we made submissions to the -- to the City of Whitehorse to try and get a reduction to the mill rate.**

**But at the end of the day, as we outlined in the application, the Takhini site wasn't really an option for us at the end of the day because Kwanlin Dün, once -- you know, they actually didn't forward us an offer for the Takhini site at the end of the day. And I would speculate that they observed the outcome of our** 11:29
**public engagement on this Takhini site and they -- they probably noticed that there was quite a bit of public opposition to the Takhini location. And on that basis we actually never received a lease offer from them for the Takhini site.**

**So at the end of the day the choice was between the two sites in Whitehorse.**

Q. Thank you. And I think that's well detailed in your application, Mr. Hall, but I appreciate that additional explanation. 11:30

In terms of the annual OpEx, annual costs of 230,000, how much rigour or analysis was used to determine that estimate?

**A. MS. MILOJEVIC: I'll ask Ms. Zuliani to comment.**

Q. Thank you.

**A. MS. ZULIANI: Thank you, Ms. Milojevic. So, again, this is based on Hatch's internal information based on other projects and from vendors. Typically with these projects vendors do engage in a site preventative maintenance visit once or twice a year. As allocated -- explained in the note, we did allocate a cost for technicians to come to site, as well as an allocation for parts. Batteries tend to be a relatively low maintenance item, there's not a lot of replacement parts.** 11:31

Q. And is that -- in the Footnote 2 at the end, where it says plus the $2.25 per kilowatt hour per year and $4 per kilowatt per year for parts and preventative maintenance, is that based on an averaging of prior periods or is that again just an estimate from judgment, and similar projects?

**A. MS. ZULIANI: It's based on similar projects, as well as items that a vendor would offer as part of their preventative maintenance offering.**

Q. Okay. Thank you. I'd like to move to another Board IR, IR 10(d), at pdf page 141. And it's page 1 of 2. So pdf 141. 11:31

And in that IR the Board asked: (as read)

"From an O&M perspective, what does YEC forecast the annual thermal management

costs to be for each year of its expected 20-year life? Please provide details."

And then if you go to the next page, as the response to part (d), that starts with: (as read)

"The BESS will have a modest electrical consumption during idling periods to cover auxiliaries and heating in the winter. It is anticipated that this electric consumption would be 2 to 4 percent of the total annual energy throughput. However, the consumption will depend on the selected vendor system configuration. Heating load will also vary year to year, depending on the ambient conditions." 11:32

So, Ms. Zuliani, either you or YEC could answer this, but I'm wondering how the 2 to 4 percent was determined.

**A. MS. ZULIANI: So, again, it's based on typical configurations for an HVAC, for a containerized battery system.** 11:33

Q. Did Hatch make any adjustments to that range of 2 to 4 percent to reflect Yukon's northern climate?

**A. MS. ZULIANI: This would have been based on northern climate projects.**

Q. Okay. And those were the ones that were referenced, such as the one in Quebec or the Northwest Territories, those types of projects?

**A. MS. ZULIANI: Well, it would have been based on projects where Hatch was involved in the northern climate type project.**

Q. Okay. Do you know how many of those were used to derive the 2 to 4 percent?

**A. MS. ZULIANI: It's based on a few projects. It's fairly typical. I mean, this is a, you know, an HVAC unit, it's a fan, a heating system. It's not going to vary drastically from project to project.** 11:34

Q. Okay. So I'm just trying to get an understanding on scale, you know, because I'm not as familiar with -- with battery storage projects. So are we talking about under 5? You know, under 10? 20? What's kind of the number of -- roughly the number of projects you would look at to derive that estimate of 2 to 4 percent?

**A. MS. ZULIANI: Well, it would be under five projects, but, again, it's a fairly standard unit. It's a fairly small component of the operating costs, so...** 11:34

Q. Okay. Thanks, Ms. Zuliani.

I'm going to move to some questions about

operating reserve, and there was some questions on that yesterday. But I'm going to have the panel turn up IR 51 on page 395, that's the pdf. And then the response starts on pdf 396, hard copy page 2 of 4.

And I'm looking at part (a) where YEC stated: (as read)

"When Yukon Energy is experiencing high water all of the hydro generator capacity is used to generate power and therefore cannot be used for operating reserve. Spinning reserve only occurs when a generator is not at nameplate capacity."

11:35

To confirm, when there is high water and the hydro generator is not at nameplate capacity, hydro can provide some or all of operating reserve; is that right?

A. **MS. MILOJEVIC: Could you repeat your question one more time, Ms. Sabo?**

Q. No problem. When there is high water and the hydro generator is not at nameplate capacity, hydro can provide some or all of the operating reserve; is that correct?

11:36

A. **MS. MILOJEVIC: Yes, that is correct.**

Q. Okay. And can hydro provide operating reserve during off peak?

**A. MS. MILOJEVIC: Yes. Hydro can provide operating reserve at any time if the operator operates the unit at less than its full output.**

Q. And that's true for the whole year round? I understand it would be more difficult in winter, but that could be done all year round; yes?

**A. MS. MILOJEVIC: Yes, that's correct.**

Q. Can hydro provide all operating reserve for off peak during non-winter periods?

**A. MS. MILOJEVIC: It depends on the circumstance. So when we think about -- just kind of going back to the basics of operating reserve, when we talk about operating reserve, it's essentially -- in order to keep the grid online, we need to match the load, the demand with the supply, or generation.** 11:37

**And so in order to be able to respond to load increases, if we suddenly have jumps up in load or if we lose a generator, we need to have generation available that can instantly ramp up to either replace the lost generation or to address the growth in the load or the increase in the load.** 11:37

**So any time that we want to provide operating reserve from a hydro unit, you run the unit at less than its full output. Depending on the time of year and the specific system conditions on the time, at the**

**time, that may mean that you would have to run thermal units and -- and end up with a fuel cost for the thermal in order to replace the energy you're not providing with the hydro unit because you're using it for reserve.**

**So I believe, Ms. Sabo, your question was around off peak. It is likely the hydro units could be providing operating reserve, but it would also just depend specifically on their operating restriction at the time and what the load was.** 11:38

Q. Okay. Thank you. If I can now take you to the table in that IR response, the response part (c) through (e), and it's on hard copy 3 of 4. At the top of the page there you'll see it.

And in that table does the calculation of the savings include any BESS-related capital costs?

**A. MS. MILOJEVIC: No. So this is the savings based on using the battery for operating reserve. Those savings and the battery costs are reflected in Table 4.3 of the application, which presents the** 11:39 **project economics overall.**

Q. Okay. And the O&M costs are also not included in this table we just went through, where it was in the application; correct? So no operating and maintenance costs in this Table 1 as well?

**A. MS. MILOJEVIC: No. This table is meant only to show the savings from the battery operating reserve use case. The economics, which include the operating costs, the recharging costs, and the capital costs, again, are in Table 4.3 of the application with the project economic justification.**

Q. Great. Thank you for that clarification.

If you could now go to IR 65, which also dealt with operating reserve, and it's pdf page 479, hard copy page 1 of 2, and it's 65(a). 11:40

And on that page the Board asked a question on a statement from the Hatch report, and I'm looking at line 22, which states: (as read)

"No. When YEC is experiencing high water flows, often the hydro generators must be operated at maximum output and therefore cannot be used for operating reserve. Accordingly, during years with high water flow volumes, the BESS will directly reduce the amount of thermal 11:40 generation as it will reduce the number of thermal units required to be online to provide the operating reserve unavailable from the hydro units."

Can you explain whether the hydro generators operate at

maximum output only if the load exceeds the maximum output? Just wondering from an operating perspective how that works.

**A. MS. MILOJEVIC: So when we dispatch the system, there would be a number of factors considered. So, for example, you may have some units offline, in which case you might be up at maximum output; or you may be at less than maximum output, for example, if you need the unit to provide operating reserve. So it would depend on the specific system conditions at the time.** 11:41

Q. And if there's a need for baseload thermal generation -- I'm going to start that again.

If there is a need for baseload thermal generation, is operating reserve covered by further incremental thermal generation or is hydro held back to provide a store of operating reserve?

**A. MS. MILOJEVIC: Yes. Hydro would be held back to provide a store of operating reserve.**

**So just to be clear, Ms. Sabo, this is the key operating reserve benefit that the battery provides.** 11:42 **So where -- when you have thermal generation online and you have a hydro unit that's not at its maximum output because it needs to be able to provide operating reserve, when the battery is connected to the grid, the battery is simply being plugged into the system, as it**

were, is providing that operating reserve.

You can then increase the output of the hydro units, which then increases your hydro generation and decreases your thermal generation accordingly. With those fuel costs savings from being able to operate your hydro units at a higher output level, that results in the operating reserve savings from the battery that's presented in the application.

Q. Thank you. I'm going to take you to pdf page 15 of the application, hard copy page 11. 11:43

And we just wanted to clarify some information in the application compared to Footnote 14 that's detailed in the application.

So on hard copy page 11, pdf page 15 of the application, YEC states at the start of the last paragraph of that page: (as read)

"Based on 2019/2020 year YIS operation an average annual water flow, the average monthly operating reserve on hydro turbines ranges from 2 megawatts 11:43 to 8 megawatts across the year (includes all months), with an annual average of 4.8 megawatts."

And then if you look at the footnote statement, it references the 2019 to 2020 year and the report dated

August 24th, 2020, of Hatch. Do you see that?

**A. MS. MILOJEVIC: Yes.**

Q. Great. And our question is, given those two items, with 2019 and 2020, the fiscal year being incomplete at the date the report was prepared and full actuals would not have been known, can you help me out on how the numbers were derived, the 2.4 to 2.8 and the average of 4.8? I'm just trying to clarify, given those statements, how were those numbers really calculated.

**A. MS. MILOJEVIC: Yes. So, typically, when we refer to years, we refer to these double years you'll see. So you'll see us talk about winter 2019/2020 or 2018/2019. And that's because from the utility's perspective our peak period goes from the winter which starts in November, December of the year and ends in February the following year. So we talk about -- we tend to talk about those winters as year/year, even though it's not a calendar year.** 11:45

**I'd have to ask Ms. Zuliani to comment on exactly which months were specifically looked in the Hatch analysis being referred to on this page.** 11:45

Q. Great. Thank you. I also think of March to March, so that's helpful.

Ms. Zuliani, can you help me out?

**A. MS. ZULIANI: Yes. So Yukon Energy provided us**

**the data from when we started the project, which was mid January 2020. So it was from mid January 2019 to mid January 2020, encompassing the peak that was included in January 2020, which is why we included that period of January.**

Q. Ms. Zuliani, can you provide me with any more information on how Hatch determined the average water year water flows in your report?

**A. MS. ZULIANI: That was provided to us from Yukon Energy.** 11:46

Q. Okay. And either you or Yukon Energy, can you give me a description of what the information used to derive that average included?

**A. MS. MILOJEVIC: So it would have been using our historical average, which is what we used to determine an average water year.**

**A. MR. HALL: Sorry, this is a fairly important concept that underpins a number of different calculations that we make for admitting (phonetic) purposes.** 11:47

**So I believe we're up to 38 water years of history that are taken and looked at together and used to develop an average over that period.**

Q. And that's a hard average, not like a rolling average? You actually take your entire historical dataset?

**A. MR. HALL: Correct. So as each year is added, the dataset becomes bigger.**

Q. Okay. I'm going to go to the application again, pdf page 16, hard copy page 12. And at the bottom of the page there's a paragraph that starts: (as read)

> "The Hatch analysis estimated potential reduction in direct thermal generation used to provide operating reserve by estimating when thermal generation was used in 2019/20 to provide operating reserve. However, the full benefits of the thermal displacement as estimated by Hatch are not expected to be realized given the relationship between thermal generation and subsequent hydro storage availability."

And this may be best for Ms. Zuliani. Given that estimate average annual water flows are noted to be used in Footnote 14, which we just discussed, and the application refers to estimating when thermal generation was used in 2019 to 2020 to provide operating reserve, is there any more detail you can provide me? Is there a disconnect here on the calculations or is this IR -- does it just confirm what you had told me about how these numbers were calculated for operating reserve?

11:48

11:49

**A. MS. ZULIANI: Sorry, could you please repeat the question, Ms. Sabo?**

Q. Okay. Given that the estimated annual water flows are noted to be used and for Footnote 14 and the application refers to estimating when thermal generation was used in 2019/2020 to provide operating reserve, are those statements consistent between what's in Footnote 14 and what's on -- in page 12 of the application at the bottom of the page?

And if you need a moment to read that, that's fine. 11:50

**A. MS. ZULIANI: So my understanding is after we submitted our report with our estimates, Yukon Energy reviewed those estimates and decided for the purpose of this application to reduce them, as outlined in Footnote 17, to just include the spring period.**

**But Hatch was not involved in that process.**

Q. Okay.

**A. MS. MILOJEVIC: If I could provide some context maybe, Ms. Sabo.** 11:51

**So when we talk about the direct thermal generation used to provide operating reserve, that is driven by the hydro used to provide operating reserve that I believe you were referring to in Footnote 14.**

**So Hatch's calculation, which used average water,**

**determined when -- so essentially when a hydro unit was providing operating reserve and at the same time a thermal unit was online, again, during those periods, that's when a battery would be able to provide the operating reserve, increase the output of the hydro unit, and, as a result, decrease the thermal generation and result in those fuel costs.**

**And Ms. Zuliani referred to an adjustment that YEC made. So Hatch did their calculation based on the year 2019/2020 and looked at year round how much thermal** 11:51
**savings could be -- could be gained by use of the battery, again, to increase the hydro production and decrease the thermal production required for operating reserve.**

**As I explained, I believe in Mr. Maissan's cross yesterday, when we looked at that, we believe that in an average water year, if you didn't use the thermal in the fall and winter at some point, you would use it elsewhere in the year. And so we reduced the savings calculated by Hatch by two-thirds. As I outlined** 11:52
**yesterday, that's probably on the very conservative side, but we did make that adjustment, as well as adjust the fuel cost to reflect the same fuel prices as shown in the 2021 GRA from mid 2020.**

Q. Thank you. Ms. Zuliani, do you have anything else to

add on how you calculated the estimated savings of BESS or anything else you'd like to add in general?

**A. MS. ZULIANI: I think Ms. Milojevic covered it well. We used the average water year, compared to 2019, and identified opportunities throughout the year on an hour-by-hour basis, outlining when thermal was on and when it could potentially be replaced by hydro if the BESS was available for operating reserve.**

**We never went above the annual -- or the long-term average water year. We never assumed that hydro would come online if there was a model.** 11:53

Q. Okay. Thank you, panel.

MS. SABO: Mr. Chairman, that's a good place for me to break, if you're so inclined.

THE CHAIR: Very good. That seems reasonable. So we'll take an hour and a half. That would get us back here at 1:25 Yukon time, give or take, plus or minus.

Okay. Be back at 1:25.

(PROCEEDINGS ADJOURNED AT 11:54 A.M.) 11:54

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PROCEEDINGS ADJOURNED TO 1:25 P.M.

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(PROCEEDINGS RESUMED AT 1:32 P.M.)

**M. MILOJEVIC, A. HALL, E. MOLLARD, J. ZULIANI (For Yukon Energy Corporation), previously affirmed**

THE CHAIR: Okay. Welcome back, everyone.

Ms. Sabo, are you ready to proceed with the remainder of your questions? 13:30

MR. LANDRY: Mr. Chair, if I may -- sorry, Ms. Sabo -- I wonder if I could just do a bit of housekeeping on the record, if that's okay, Ms. Sabo, before you start?

THE CHAIR: Sure.

MS. SABO: Thank you, Mr. Landry. Go ahead.

MR. LANDRY: I apologize for interrupting.

The panel has a couple of corrections and clarifications that I think would be worthwhile getting on the record now, given the type of questioning of Ms. Sabo and potentially by the Board. So if I could be given a little bit of indulgence here and ask the panel to maybe read the corrections and/or clarifications into the record. 13:30

THE CHAIR: Now's the time for it.

MR. LANDRY: Panel?

**A. MS. MILOJEVIC: All right. So a couple of corrections -- thank you, Mr. Landry, thank you, Mr. Chair -- in the application.**

**So the first being on page 17 of the application, the hard copy I'm referring to, Footnote No. 30. The footnote reads LCOC for 12.5 kilowatts new diesel. That should -- the "kilowatt" should be "megawatt." So it should read: "LCOC for 12.5 megawatt new diesel."** 13:31

**The second correction -- oh, sorry. Yes. So the second correction is on page 28 of the hard copy of the application. This is Table 4-1.**

**In the title it reads: "Forecast Non-Industrial Peak and Dependable Capacity under N-1 Capacity Planning Criterion: 2021/22-2030/31 Winter (megawatts)."**

**The megawatts should be corrected to kilowatts. So the values shown in the table are shown in kilowatts.** 13:32

**Then on the transcript from yesterday's process, on page 112, line 6 through 7, Ms. Sabo asked if the BESS Project will displace 7.2 megawatt hours of thermal generation, and Mr. Hall replied "yes." The "yes" is on page 112, line 15. A correction is needed**

**in that the BESS Project will replace 7.2 megawatts of thermo generation. So it's just the unit correction there, from megawatt hours to megawatts.**

**And then finally, in Ms. Sabo's questions to myself this morning around Table 3-4 on page 16, hard copy of the application, the estimated capital costs for project facilities, Ms. Sabo had a line of questioning around the contingency in this application. And I had noted that the 15 percent contingency was only applied to the estimates provided by Hatch.** 13:33

**When I was stating that, I believed I noted just the battery system and power conversion system line items in the table. However, it should be noted that the only costs that were excluded from the Hatch report in terms of what would not have had a contingency applied are the line items planning costs and owner's costs. All of the other line items including engineering services and project management, grid connection, and site preparation costs were included in the Hatch estimate and, therefore, were part of the** 13:34 **costs that the 15 percent contingency was applied to. I just wanted to provide that clarification.**

**Thank you, Mr. Chair.**

THE CHAIR: Thank you. That certainly helps.

MR. LANDRY: Thanks, Mr. Chair. So I

appreciate your indulgence, and back over to Ms. Sabo.

MS. SABO: Thank you. And I have no further questions on those corrections, for the record.

**MS. SABO QUESTIONS THE PANEL:**

Q. Panel, we have been waiting for this final topic. I'd like to talk about the debenture investment. And I appreciate that there's ongoing negotiations on this issue, so I appreciate that you might not be able to fully respond to some of these if information isn't public or there may be limitations on how you can respond given those negotiations. But I'm going to ask and try to keep my questions fairly factual, except for a few scenarios. 13:34

I'd like to take you to your opening statement, Exhibit B-5, and on page 5 of that opening statement. And therein, before its concluding paragraph YEC states: (as read)

> "The proposed debenture investment approach is a measure that enables First Nation investment in clean energy development with no change in the costs paid by ratepayers. Similar debentures have been provided to enable First Nation investments in YEC transmission, hydro (Mayo B), and LNG 13:35

projects in the past. The BESS Project is the first instance when Yukon Energy is to provide such a debenture rather than Yukon Development Corporation."

And in the next paragraph: (as read)

"The proposed debenture investment opportunity for KDFN and TKC is a loan that will receive a return based on YEC's annual return on equity. The proposed debenture investment will be included as part of YEC's equity return when setting rates without any changes in the 40 percent equity share assumed in the capital structure when setting rates. The end result will provide the same overall return as part of YEC's revenue requirement as it would currently for YEC without any impact to ratepayers." 13:36

So given that opening statement, I just wanted to confirm that this is not a traditional loan in the sense that YEC as a public utility would not normally require such a debenture agreement funding for the equity cost for a project. Is that fair? 13:36

**A. MR. MOLLARD: I'm going to ask you to read that**

**question again, if you could, Ms. Sabo. I want to make sure I got all of it.**

Q. Okay. This is not a traditional loan in the sense that YEC is a public utility, would not normally require a debenture agreement with First Nations for funding for the equity costs of a project?

**A. MR. MOLLARD: Yes. I just got tripped up a little bit on your first statement because it is structured as a traditional loan instrument, but I'll focus on what you said at the end. In normal course of business the equity component would be provided by the shareholder, Yukon Development Corporation, either through a direct investment or through accumulated earnings.** 13:37

Q. Thank you. And I understand what I just read in the opening statement means that the arrangement that is contemplated with the two Indigenous groups does not create an equity interest in the rate base of YEC?

**A. MR. MOLLARD: Yes. I'm going to use slightly different wording, Ms. Sabo. It does not give them ownership interest.** 13:38

Q. Right.

**A. MR. MOLLARD: And that's just a fine point between sort of legal and accounting jargon, if I could say it that way.**

Q. Right. And maybe just to add to that, on a conceptual level rather than a lawyer and accounting level, how I see this is there's a loan to YEC and how the interest, for lack of a better word, to be paid on that loan is based on the percentage of equity? It's not an ownership interest? Do you see what I'm saying?

**A. MR. MOLLARD: That's correct.**

Q. Okay. Thank you. That's helpful for context.

I'd like to understand a little bit more on why YEC is required to be a party to the agreement rather than Yukon Development Corporation, that has traditionally been done for facility projects in the past. 13:39

**A. MR. HALL: Andrew Hall. So historically, Yukon Development Corporation entered into these kinds of transactions with Yukon First Nations on prior YEC projects. In this case they did not have the ability to do so, and so Yukon Energy -- you know, our board made the decision that Yukon Energy would be entering into the transaction.** 13:40

**A. MR. MOLLARD: With the understanding that we would be able to get the approval of this Board to do what we're asking for to treat it as equity.**

**A. MR. HALL: Right.**

Q. Okay. And you said, Mr. Hall, that YDC did not have

the ability to do so. So was that financially driven or for some other reason?

**A. MR. HALL: I can't really speak to their -- their reasoning. That would be for them to speak to. But we were just instructed that at this time they were not able to be the counterparty in this transaction.**

Q. Thank you. I think that's sufficient, Mr. Hall.

Other than YEC being the contracting party, are there other differences in the debenture agreements you're contemplating for the BESS Project that would be different from past agreements? I'm just wondering on terms or subject matters, is there any differences other than YEC is the contracting party and not YDC? 13:40

**A. MR. MOLLARD: Just to be clear, Ms. Sabo, you're talking about the differences between this deal and the previous deals that were done under YEC's umbrella?**

Q. Yes. Like the agreements. Are there any major differences we should know about?

**A. MR. MOLLARD: And I can't remember which one. This note is based on our actual ROE for the year. I believe the Mayo Dawson note was a blended debt and equity note from the early 2000s. And LNG was blended. And, sorry, LNG was also a blended rate.** 13:41

**But other than those rate differences, the terms**

**are basically the same. It's a pretty standard debenture note.**

Q. Okay. Thank you. Given YEC's position that the agreement -- the costs of the agreement will be neutral to ratepayers, wouldn't it be the preference to have somebody else be the signatory, like the government of Alberta or YDC, if possible? I'm just thinking there's cost impacts potentially to this agreement, and, you know, having it through YDC or the government might provide some backstop or some other things you're not able to provide to the agreement, rather than the utility doing it. 13:42

**A. MR. MOLLARD: That would have been our preferred choice, to have it executed through the parent, but, as we said, they declined to participate. So we were left with this option.**

Q. Okay. Will the debenture be used in YEC's overall calculations to determine its cost of long-term debt?

**A. MR. MOLLARD: No. The proposal that we put in front of you is that it will be -- the interest paid will be considered return, not interest costs. So that's just to respect that -- to keep everybody whole we have to keep that -- the interest and the principal on the equity side of the formula.** 13:43

Q. Thank you, Mr. Mollard. I'm always thinking forward to

a GRA, as you well know.

I noted -- if I could take you to IR 7 (d) through (f). And that response is in the consolidated IRs, I believe on page 134, and the hard copy is page 4 of 6. And just keep that IR open because most of my remaining questions will deal with IR 7.

So in IR 7 (d) through (f), lines 3 to 13, there is a response that says, in summarizing -- and I'll summarize it. It says if an option is purchased to -- included to purchase the battery after five years by 13:44
Kwanlin Dün First Nation or Ta'an Kwach'an Council, is included in the agreement.

I was just wondering if you could give me more context on -- I know that there hasn't currently been legal opinions on whether anything is going to trigger the *Public Utilities Act*, but if there's an option to be included, that may change ownership interest.

So are there going to be legal opinions on that final language if there's an ownership interest?

**A. MR. MOLLARD: Yes. There would be legal** 13:45
**requirements to have this reviewed as to whatever the final terms were.**

Q. But currently we're just dealing with the debenture agreement without options, as what's been submitted in the application, Mr. Mollard; right?

**A. MR. MOLLARD: Yes.**
Q. We're not dealing with an option yet?
**A. MR. MOLLARD: Correct.**
Q. Thank you. I'm going to bounce you over to the terms of reference, and term of reference 3(e). And that's the one that reads: (as read)

> "Impacts on YEC and ratepayers of the debenture investment opportunity that YEC is providing to TKC and KDFN in recognition of the BESS Project's location on the overlapping Traditional Territory of the TKC and KDFN and the benefits of TKC and KDFN support for this Project's development at this time."

So in terms of that terms of reference, how can the Board view whether there are impacts to YEC and its ratepayers due to the debenture investment opportunity without us actually knowing the finalized terms of the agreement? 13:45 13:46

So how are we supposed to evaluate the agreements and the impacts on ratepayers and YEC without having finalized agreements?
**A. MR. MOLLARD: I think the short answer, Mr. Chair, is that the items that were remaining to be**

**negotiated will not affect the treatment of the note.**

**So if the Board sees through to bless this arrangement and say, yes, you can proceed on this basis, while the numbers may change, it won't affect my overall costs and it won't affect ratepayers. Because effectively what we've committed to do is saying that whatever that debenture principal amount becomes, I will adjust my equity slice with my shareholder to ensure that I'm at 40 percent value.**

**As the Board previously directed, we must stay 60/40. So I'm just substituting a KDFN dollar for a YDC dollar, or vice versa. So that will keep me whole and that will keep ratepayers s whole.** 13:47

Q. And do you have an estimate of the timing, Mr. Mollard, on when those agreements will be finalized?

**A. MR. MOLLARD: The finalization won't be able to be done until we finish the project because the value of the debenture is based on the ultimate project costs.**

Q. Right. And I'm going to get there in a few questions. 13:48 I'm just trying to think about if there are material changes that would impact the substantive terms of the debenture agreement or the project, how would YEC communicate that either to the Board or the government, given the approval its asking for from the government

of Yukon?

**A. MR. HALL: I can answer the first part, Andrew Hall.**

**So we have to approve -- seek the approval of the Yukon government for the -- any implications for territorial debt cap of this transaction. And so there would be a process that we'd be going through with the government at such time that the dollar value of the investments is known, and that would be after construction is complete.** 13:49

**Mr. Mollard can speak to, you know, how we would bring this forward to the Yukon Utilities Board.**

**A. MR. MOLLARD: Yeah. So ultimately from a rates perspective, when we have the project complete and the debenture settled, we would at some point be required to come before this Board for a prudency examination. And they would be looking at not only the costs of the project as it flows through return and depreciation, but also through that debenture cost, which would be -- that would be the first time it would be included** 13:49 **in our revenue requirement. So there would be an opportunity for the Board to review it at that time.**

Q. Okay. Thank you, sir.

I'm going to move up back to the IR, and YEC 7(b), if you can get there. And I'm looking at line 20 once

you're there. Therein it states:

"The timing for the capital investment with respect to the debenture has not been determined by the parties. It is expected that a reasonable time period will not be required after projects enter service and YEC determines the final net capital cost amount."

So how will YEC determine what is a reasonable time period after the project enters service and it can determine the final net capital cost amount? 13:50

A. **MR. MOLLARD: For the purposes of determining that, a net capital cost amount, it's really just a paperwork exercise. It depends how quickly we get the bills in from your subcontractors, you know, go through and confirm that the amounts are all valid with the work orders. It's an administrative procedure to wrap up the project and determine what the final number is. Typically I would expect 60 to 90 days sort of to wrap that up.** 13:51

Q. That would seem to be a usual billing period, Mr. Mollard, so that's helpful.

I'm going to move to part (g) of the IR response and starting on lines 28. And that's on hard copy page 4 of the IR.

In line 28 YEC quotes the application and states -- and I'm not going to read this all out, but it starts with: (as read)

"In accordance with current accounting regulations the project First Nation debentures would be treated as long-term debt given the nature of the financial instrument."

And then the response goes on.

So reading that, can you confirm by YEC providing an equity level of return for this investment it's effectively providing an offsetting long-term debt return on the remainder of net rate base to ensure that the total net rate base maintains the 60/40 debt equity ratio? 13:52

So I know that's a long-worded question, but I'm just trying to confirm you're going to balance the 60/40 debt equity ratio.

**A. MR. MOLLARD: Yes, that is confirmed.**

**And just to help a little bit, Ms. Sabo, and the true-up -- to be clear, the true-up to 60/40 is done annually and it is on a corporate basis. So we have to assess how much net income we've made and how much that adds to equity, where our rate base is at the end of the year, which drives out the 60/40 split, and then we** 13:52

**true up off of that. So it won't be a transaction that is isolated to this project and the equity assigned to this project. It will be done on a corporate basis, but the effect will be the same.**

Q. Okay. So that's interesting, because are you going to be able to track kind of the rebalancing of that split as it relates to this project or it will just be adjusted as part of -- like you say, as part of your quarterly?

**A. MR. MOLLARD: Yeah, no, excellent question.** 13:53

**So what will happen is that the -- because this is legally a debenture, and I'm required to repay principal, the amount that the First Nation will hold will be going down over time.**

**So I'll actually have to -- in effect, I'll be looking at this every year and saying, okay, well, the First Nation, all other things being equal, I've paid down a portion of the First Nations', quote unquote, equity, therefore, I have to increase YDC's equity, which in our circumstance usually means a reduced** 13:54 **dividend, but it will balance out in that that way so we respect overall to 40 percent balance.**

Q. Okay. I'm sure our rates folks will love to get an illustrative example in a DRA, but I'm not going to undertake for you to do that now, Mr. Mollard.

**A. MR. MOLLARD: Thank you.**

Q. And we talked about this earlier, but I just want to make it really clear, from YEC's perspective, is the debenture agreement -- and I'm going to use the term that it's a "deviation" from traditional YEC financing, and maybe that's not accurate, you can comment on that -- but can you explain for me your perspective why these debentures make sense from an economic or a financial perspective?

We've talked about the social and -- and benefits on a monetary basis to the band, but I'm wondering if you can talk about the economics or financial benefits of these debenture agreements? 13:55

**A. MR. MOLLARD: So short answer is, it doesn't make sense from a financial perspective, it's neutral from a financial perspective, so I have no -- I have no inclination either way financially.**

**But from a project perspective and a relationship perspective, we need to consult with the First Nations, we need their support on the project. So it makes sense from that perspective of -- of First Nation support and social licence.** 13:55

Q. And, Mr. Mollard, can you comment, I understand, maybe not this type of arrangement, but financial arrangements with First Nations are becoming more

common in Canada, right, on all sorts of projects.

Can you maybe give me some context on whether you think this is similar to what's being done elsewhere, if you know?

A. **MR. HALL: I think what's important to consider here is that there are obligations, actually, under Chapter 22 of the final agreement as it relates to providing this kind of investment opportunity. Now -- and that really explains some of the investments that were offered in the prior Yukon Energy projects.** 13:56
**So there's precedent through final agreements in Yukon that speak directly to this kind of investment.**

**As we outlined in the application, in this particular case, you know, our view was that obligation wasn't necessarily there because of the nature of the project; but, you know, for the reasons I outlined and spoke to yesterday, our Board made a decision to offer the -- an investment nonetheless.**

**But in terms of the nature and trigger for this kind of investment, there's good precedent with our** 13:57
**corporation in this jurisdiction, let alone other jurisdictions. And -- you know, I think I'll stop there.**

Q. And just to -- just a clarifying point, Mr. Hall. You said Chapter 22 outlines the obligations. So is that

kind of -- I'm just trying to think, what's the title of Chapter 22? Is it the obligations of each of the parties? Can you give me more context on kind of what that chapter does?

**A. MR. HALL: Sure. So, subject to check, Chapter 22 of, in this case, the time and Kwanlin Dün final agreement speaks to economic investment opportunities, I believe.**

**It's a fairly standard chapter that appears, I think, pretty consistently in all of the individual final agreements.** 13:58

Q. Okay. Mr. Hall, yesterday you stated on the transcript, and I don't think you need to pull it up, that -- but on page 87, you said that the term sheet has been signed with the two Indigenous groups.

Is that term of reference sheet confidential or proprietary? Are you able to provide it on the record of this proceeding?

And if you want the transcript reference, it was page 87, lines 9 to 11. 13:59

**A. MR. HALL: Ms. Sabo, I'm going to have to take an undertaking on that, because I don't recall the confidentiality provisions that may exist in that term sheet, so I'm going to have to revert on that.**

Q. That's fine, Mr. Hall. Just to confirm the

undertaking, you are going to undertake to check whether the term sheet that has been signed, as noted on page 87 of the transcript, if that is confidential, and if it's not, that you will disclose it to the Board.

**A. MR. HALL: Yes, correct.**

**UNDERTAKING - TO CHECK WHETHER THE TERM SHEET THAT HAS BEEN SIGNED, AS NOTED ON PAGE 87 OF THE TRANSCRIPT, IS CONFIDENTIAL; IF NOT, TO DISCLOSE IT TO THE BOARD**

Q. MS. SABO: Thank you, panel, we really appreciate all of your questions -- answers and questions, I guess, over the last few days.

Subject to any follow-up on undertakings, which we will do in writing if necessary, that concludes my questions on behalf of the Board staff.

**A. MR. MOLLARD: Thank you.**

MS. SABO: Thank you.

13:59

THE CHAIR: Mr. Landry, what we're thinking is that members of the Board would like an opportunity overnight to sort of digest today's proceeding, the evidence and so on, but we're mindful that it is as well still relatively early in the afternoon.

14:00

I'm wondering whether you would like to take time

this afternoon to do redirect with your panel, and then in the morning, the Board could put their questions to the panel, following which you'd have a second crack at, you know, dealing with anything that arises from the Board's questions.

Does that sound workable for you?

MR. LANDRY: Mr. Chair, I don't think my redirect will be long, but if you would just give me a moment to just take a look at my notes, I could see if I could accommodate that. 14:01

THE CHAIR: Certainly.

MS. SABO: Maybe we can take a five- or ten-minute break and come back if Mr. Landry needs --

MR. LANDRY: If we could, just give me one moment because the timing would probably be better if I do it now.

Look, why don't we do this -- am I back on video? Let me give it a go and I may have to seek your indulgence tomorrow, Mr. Chair, if indeed I have a couple of follow-up questions. If that's okay with you, I'll give it a go now. 14:02

It might be helpful to you because some of them are clarifications that might be helpful for the Board in their discussions overnight.

THE CHAIR: Certainly. Yeah. We're quite

flexible.

MR. LANDRY: Okay. Well, look, let me try a few, and if I get bogged down, we may switch off, but let's see if I can make some headway.

**MR. LANDRY RE-EXAMINES THE PANEL:**

Q. Panel, and I guess this is really to Mr. Mollard.

In one of the questions from Ms. Sabo, she was referring to the other First Nation investments that had been done through YDC, and you mentioned the LNG project, I believe, and the Mayo-Dawson line, which were, I think you said, a couple of them had a blended interest between equity and debt. 14:03

You did not mention the investment in Mayo B. How is the interest in that debenture calculated, do you know?

**A. MR. MOLLARD: Subject to check, that's also an equity return similar to this note that we've proposed for this project.**

Q. Okay. So it's -- in a sense, LNG and Mayo-Dawson are different than either Mayo B or this debenture; correct? 14:03

**A. MR. MOLLARD: That's correct.**

Q. Okay. Over to Ms. Zuliani, if I can.

There were a number of questions, Ms. Zuliani, that Ms. Sabo asked of the YEC panel in relation to the

Hatch report, and one of them related to any limitations, which was a fair question, that she asked of the panel of the findings that were in the Hatch report.

And then that ultimately led, as you'll recall, I'm sure as people were listening, you'll recall to various questions on cost that were estimated by -- mainly by Hatch, but also by Yukon Energy, and I want you to focus sort of on your report, or the report of Hatch. 14:04

What is your level of confidence on the estimates that you have provided in your report given the stage of the process that Ms. Milojevic mentioned which is the plus or minus 30 percent?

**A. MS. ZULIANI: Yeah, I mean, we're confident that the costs are within that range based on the information we put into the level of engineering at that time. But there is the additional engineering to be done, of course.**

Q. Right. And in terms of battery projects, what is the sense of how battery projects are coming out now as more and more are being used in terms of cost? 14:04

**A. MS. ZULIANI: Well, generally speaking, as the industry develops, the costs are decreasing due to long improved manufacturing, economies of scale and whatnot,**

**so the costs are decreasing.**

**So, generally, the costs are reasonable and can be estimated based on other projects.**

Q. Thank you. Now, I wonder if I could take you to your report, Ms. Zuliani, or the Hatch report, and just so we have a reference on the record, it's in relation to Ms. Sabo's questions regarding Table 11.1 and 11.2, which I believe if people go to the application, I think I have this right, pdf 165. So let's see if I am right. I've just got to get out my -- 14:05

MS. SABO: Yes, that's correct, Mr. Landry.

MR. LANDRY: Thank you. Just give me a second to get there myself.

Q. Okay. Do you have pdf 169? I guess in the report it's page 99 before you, Ms. Zuliani?

**A. MS. ZULIANI: Yes.**

Q. Do you recall when Ms. Sabo asked you a number of questions on 11.1 and 11.2?

**A. MS. ZULIANI: Yes.**

Q. I notice, if I go on to the BESS size, on the far left column, that for either one, either the TKC site or the KDFN site, that the actual size, at least in those tables, is not the size that we're talking about here; correct? 14:06

**A. MS. ZULIANI: That's correct. It's in a later**

**table in the report.**

Q. And that's where I was going to take you. So if you go to, I believe, and you can confirm this, to Table 11.5, which is pdf 167 and page 101 of the report, and that Table 11.5 is in relation to the KDFN site; correct?

**A. MS. ZULIANI: Yes, that's correct.**

Q. And the sizing of the project, which one of the three items there would accord with what we're discussing at this hearing?

**A. MS. ZULIANI: The last row in the table, the 20-megawatt, 40-megawatt hour system.** 14:07

Q. Okay. And, if I understand it, the capital pool CapEx, and you went through how you calculated these in these tables, is 28.8 million?

**A. MS. ZULIANI: Yes.**

Q. Okay. If you can just indulge me for a moment, Ms. Zuliani, if you could go back a couple of pages, to pdf 164, which is page 98 of the report.

**A. MS. ZULIANI: Yes.**

Q. And just to make sure everybody is there. 14:08

There you'll see, I don't know, about halfway down the page, it says: "The CapEx costs include..." and there's a number of items bulleted there. Are those the CapEx costs that would have been included in that -- using Table 11.5, the 28.8 million?

**A. MS. ZULIANI: Those are other items that are included in there in addition to the major equipment capital costs.**

Q. Right. And so effectively, if I understand the comment, down below the bullets where it says: (as read)

> "Allocations for owner's costs, permitting, et cetera, have not been included in the estimate."

Correct? 14:09

**A. MS. ZULIANI: That's correct. Yukon Energy estimated their owner's costs.**

Q. Okay. So just so we have a full reflection of that, if you can now going to Table 3. -- oh, gosh. I think it's 3... I think it's 3.1, let's try page 20 of the pdf, if I've got the right one. I'll find out pretty quick here. 3.4 maybe it is.

Yes. So if you go to pdf 20, which is Table 3.4, the estimated capital costs for the project, now, that's the capital costs that was -- that was mentioned 14:09 by the YEC panel; correct?

**A. MS. ZULIANI: Yes.**

Q. Okay. So if I just look at that, the 28.88 million that you had estimated is in that 31.698; correct?

**A. MS. ZULIANI: Yes.**

Q. So that leads me to a third line of questioning. Not you, Ms. Zuliani, thank you for that.

Mr. Hall, Ms. Sabo was asking you about the certainty of these costs and the plus or minus 30 percent estimate, and you mentioned a stage-gate approach.

A couple of things. I think for the purposes of the hearing, it would be a good idea if you could explain, again, in a little bit more detail what the stage-gate approach is; and, secondly, you did focus in on the time frame that -- which I believe is a part of that stage-gate approach, where you'd be going to get approval from the YEC board, I believe you said in July and August of this year. 14:10

I wonder if you could explain at a high level the stage-gate approach and the importance of that part of the stage-gate approach and what would need to be completed by then for the Board to come to its decision. And when I say "the Board," by the way, just for clarification on the record, the board of directors of Yukon Energy. 14:11

**A. MR. HALL: So, firstly, in terms of the stage-gate approach, when Yukon Energy undertakes a project of this nature, it involves a number of tasks that are completed through time. We start with initial**

design, environmental assessment, then move through to permitting and procurement, and then finally construction.

And so if we think about that progression of tasks over, in some cases a number of years, we'll typically break it up into a number of discrete chunks. And by "chunks" I mean groups of activity where we'll ask our board for approval to complete a certain amount of work, and then come back to them to review the project again and get approval for the next chunk of work. And 14:12
that decision point is referred to as a "stage gate."

And so in a project like this we would probably have three or four stage gates prior to commencing construction and making the final investment decision.

So at this time we've got approval from our board to -- to undertake the tasks that are ongoing right now. So to complete the YESAB application and complete permitting, to go through this Part 3 proceeding that we're engaged in right now, and to complete the procurement of the battery and the site construction 14:13
contracts.

So when we get to around, I'll call it August for simplicity, we will bring this project back to our board, and at that time we'll have an updated budget based on the RFP results, and we will know the outcome

**of this Board's consideration of the Part 3 application and the subsequent government decision on the certificates that we've applied for.**

**And we'll take that package of information to our board in August, and they will make a decision whether to proceed with procuring the battery, which is basically what other companies call the final investment decision, right? And at that time they would likely approve the whole project to proceed in its entirety.** 14:14

**So I think to cut to the chase, there is a final decision to be made, and I believe the point I made earlier is if there's a massive change in cost such that the project is no longer economic and no longer confers a benefit to ratepayers, our board will have an opportunity to cease further work at that time, at that stage gate decision point.**

Q. And at that stage gate, given the items that you've listed, and you heard my questioning of Ms. Zuliani of the 28.8 or so million dollars that Hatch was involved 14:14 in, at that time you would then have those numbers crystalized when you went to your board in August. Is that fair?

**A. MR. HALL: So we would have a -- the RFP result, which would be a firm proposal from the**

**selected battery vendor. So those costs would be known with certainty. We would have a proposal from the site construction contractor, which would give further -- further certainty around the site construction work. And then the other line items, for example, the transformer, we would have our key results on that.**

**So the basic idea, Mr. Landry, is to get certainty on as many of those cost line items as possible.**

Q. Just looking at Table 3.4 again, Mr. Hall, from what I understand you're saying, that would mean you'd have certainty on virtually, for the most part, all that was there; correct? 14:15

**A. MR. HALL: Correct. I mean, there may be some contracts that are completed on what's called a time and materials basis. I don't know. Ms. Milojevic may be able to comment. But I would argue that for the majority of costs, we would know them with certainty, yes.**

Q. Thank you. Mr. Mollard, I wonder if you could go to the infamous Table 4.3, which is at the pdf 43 of the application. There were a number of questions Ms. Sabo included that asked about that, and I just wanted to make sure I understood the comment that you made back to Ms. Sabo today where you mentioned revenue 14:16

requirement in relation to this table, that it did have revenue requirement related numbers in it.

I wonder if you could just take us through this table a little bit and explain in a bit more detail what you mean by that.

A. **MR. MOLLARD: Sure. So what this table is fundamentally trying to show is ultimately what does it mean to ratepayers from these two alternative approaches: our baseline approach being rental diesels and the option to install the BESS Project.** 14:17

**And so it looked at the annualized costs, which is how we set our -- determine our revenue requirement. And so for the annual capital cost, for example in Column A of 1,530,000, that would include the revenue requirement impacts from the project, which means the depreciation, as well as the return that we're entitled to by virtue of the Act.**

**In addition to that there will be the operating costs, which is again part of our annual revenue requirement, and so on and so forth.** 14:17

**So, again, we're not providing what the effect of doing this project will be on an individual ratepayer's bill, but this gives the same answer in the sense that it provides the board with the effect on an annual basis of what the revenue requirement, which becomes**

**rates, is for the company.**

**And so at the end of the day we show that executing on this project provides a net benefit to ratepayers of some $12.7 million.**

Q. Can I try it this way, Mr. Mollard: You're effectually -- because I think there's an item in the term of reference, is that you're effectively showing the impact on ratepayers, but not the impact on individual ratepayers. Is that a fair statement?

**A. MR. MOLLARD: If I could say it this way, Mr. Landry, it's the effect on ratepayers but not the effect on their bill.** 14:18

Q. Okay.

**A. MR. MOLLARD: I'm not providing that.**

Q. Thank you. That's what I meant to say, thank you.

MR. LANDRY: Mr. Chair, those are all the questions I have at the moment, just going through my notes. I may seek a bit of indulgence tomorrow morning, but hopefully some of those questions might have helped a little bit as you consider your questions overnight. 14:19

THE CHAIR: I am sure everybody is appreciative of that little extra clarification.

So we'll resume again tomorrow morning at 9:30, and we'll see how the time goes tomorrow. I'm pretty

sure we'll not be going till the end of the day tomorrow.

So, thank you all, and enjoy the rest of your day.

(PROCEEDINGS ADJOURNED AT 2:21 P.M.)

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PROCEEDINGS ADJOURNED TO MAY 6, 2021, AT 9:30 A.M.

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Certificate of Transcript

We, the undersigned, hereby certify that the foregoing pages 190 to 297 are a complete and accurate transcript of the proceedings taken down by us in shorthand and transcribed from our shorthand notes to the best of our skill and ability.

Dated at the City of Calgary, Province of Alberta, on May 5, 2021.

"Lorelee Vespa"

Lorelee Vespa, CSR(A) RPR CRR
Official Court Reporter

"Donna Gerbrandt"

Donna Gerbrandt, CSR(A)
Official Court Reporter

- I N D E X -

VOLUME 2



EXHIBITS

UNDERTAKINGS GIVEN

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| UNDERTAKING - TO CHECK WHETHER THE TERM SHEET THAT HAS BEEN SIGNED, AS NOTED ON PAGE 87 OF THE TRANSCRIPT, IS CONFIDENTIAL; IF NOT, TO DISCLOSE IT TO THE BOARD | 283 |

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